DOCUMENT RESUME

ED 336 677 CG 023 651

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TITLE Comparing a Cognitive Model and Phototherapy in the Treatment of Seasonal Affective Disorder.
PUB DATE 7 May 91
NOTE 69p.; M.S. Thesis, Moorhead State University.
PUB TYPE Dissertations/Theses - Masters Theses (042)

EDRS PRICE MF01/PC03 Plus Postage.
DESCRIPTORS *Cognitive Restructuring; College Students; Counseling Effectiveness; *Counseling Techniques; *Depression (Psychology); Higher Education
IDENTIFIERS Phototherapy; *Seasonal Affective Disorder

ABSTRACT

Seasonal affective disorder (SAD) is characterized by recurrent major depression or bipolar disorder that occurs annually, usually later in fall as the daylight hours decrease, and that alternates with euthymic or hypomanic moods in the spring and summer. Pioneering research by Dr. Norman Rosenthal and associates has found phototherapy to be effective in ameliorating the depressive symptoms of this disorder. No research to date has studied the effects of using a cognitive approach to alleviate the symptoms of SAD. This study compared the efficacy of phototherapy and cognitive therapies (cognitive restructuring, reframing, and problem solving) in the treatment of the disorder. Subjects (N=4) were recruited from advertisements in university newspapers and from referrals from university counseling centers. Phototherapy was administered to three subjects and the three-part cognitive model was presented to one subject for a 6-week course of the therapies. The results of this study failed to support the theory that phototherapy is efficacious in the treatment of the depression associated with seasonal affective disorder. Although phototherapy results were inconclusive and cannot be generalized on the basis of a small subject sample, it would seem appropriate to include in treatment planning some cognitive work for SAD sufferers. These findings to dot discredit that premise; however, they do indicate that a cognitive model may be an appropriate adjunctive or alternative therapy. (ABL)

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ED336677

COMPARING A COGNITIVE MODEL AND PHOTOTHERAPY IN THE TREATMENT OF SEASONAL AFFECTIVE DISORDER

A Thesis

Presented to the Graduate Faculty

Moorhead State University

In Partial Fulfillment

of the Requirements for the Degree

Master of Science

by

Sandra Krantz

May 7, 1991

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Name of Candidate:	Sandra Ann Krantz
Degree Program and Major:	Master of Science Counseling and Human Development
Thesis Title:	"Comparing a Cognitive Model and Phototherapy in the Treatment of Seasonal Affective Disorder"
Time and Place:	May 7, 1991 -- 9:00 AM Owens B
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Thesis Abstract

The purpose of this study was to compare the efficacy of phototherapy and cognitive therapies (cognitive restructuring, reframing and problem solving) in the treatment of seasonal affective disorder (SAD). Pioneering research conducted by Dr. Norman Rosenthal and associates has found phototherapy to be effective in ameliorating the depressive symptoms of this disorder. No research to date has studied the effects of using a cognitive approach to alleviate the symptoms of SAD.

Phototherapy was administered to three subjects and the three-part cognitive model was presented to one subject for a six week course of the therapies.

The results of this study fail to support the theory that phototherapy is efficacious in the treatment of the depression associated with seasonal affective disorder. These findings also do not discredit that premise, however, they do indicate that a cognitive model may be an appropriate adjunctive or alternative therapy.

ACKNOWLEDGEMENTS

I would like to thank my thesis committee, Patricia Neuman, Dr. Clifford Schuette, Dr. Ernest Hallford, and Dr. Barbara Wasson for their support, guidance, and encouragement.

I am appreciative to Dr. Zeljko Jocic for his help in screening subjects and his interest in this research. I would like to thank Dr. Roland Dille, the Moorhead State University Alumni Association, and the Stille Foundation for their financial support so that this work could be completed.

I would like to express my gratitude to Dr. Greg Brack for his enthusiasm and encouragement. Also, I want to express my appreciation to Dr. Norman Rosenthal and his associates for their expertise, their willingness to share inventories and access to unpublished articles.

My appreciation to my daughters, Kirsten, Karin and Kerry for their understanding, patience and support during these trying years while I pursued my education, is beyond expression.

Finally, I want to thank the subjects who participated in the research for their time, commitment, and interest.

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CHAPTER I

Introduction

Statement of the Problem

In recent years, there has been the publication of groundbreaking research related to the treatment of seasonal affective disorder (SAD) with phototherapy. Phototherapy has been determined a successful treatment for a majority of patients who suffer from SAD. The incidence of depression, an affective disorder, on the Moorhead State University campus seems to increase during the winter months. Since the university is latitudinally located above the 45th parallel, seasonal affective disorder could be considered to be a factor in depression seen on this campus given the shortened winter daylight hours.

At present, there is no specific screening and/or treatment available at Moorhead State University for persons who could be diagnosed with SAD. This disorder presents a significant threat to psychological stability for the college student, increasing the risk and liklihood of academic withdrawal or failure, social isolation, substance abuse, general psychosocial distress and suicidal tendencies.

Additionally, researchers have not compared the use of cognitive therapy to phototherapy in the treatment of SAD. Cognitive therapy has been found to be among the most effective approaches in helping people who suffer from depression develop improved coping skills which in turn ameliorate symptoms of depression. These improved coping skills can then be generalized

to the individual's life for day to day living when they are not affected by SAD.

Purpose of Study

The purpose of this study is to compare the effectiveness of a three-part cognitive model to the use of phototherapy in the treatment of SAD.

Hypothesis

There will be a significantly superior response of the efficacy of phototherapy in the alleviation of the symptoms of Seasonal Affective Disorder as compared to cognitive models. This hypothesis tests Rosenthal's findings of the effectiveness of phototherapy in the treatment of SAD.

Definitions

Seasonal affective disorder is characterized by recurrent major depression or bipolar disorder that occurs annually, usually in late fall as the daylight hours decrease, which alternates with euthymic or hypomanic moods in the spring and summer (Blehar & Rosenthal, 1989; Diagnostic and Statistical Manual of Mental Disorders [DSM-III R], 1987; Rosenthal, 1989).

The incidence of SAD is seen more frequently in northern latitudes (Kasper, Wehr, Bartko, Gaist, & Rosenthal; Rosen et al., 1990; Rosenthal, 1989). SAD occurs predominantly in females and frequently the onset is in early adulthood or adolescence (Garvey, Wesner, & Godes, 1988; Rosenthal, 1989; Rosenthal et al., 1985; Wehr et al., 1986). Usually the SAD sufferer has a first-degree relative with a history of major affective disorder

(Eastwood & Peter, 1988; Joseph-Vanderpool & Rosenthal, 1988; Rosenthal, 1989; Wirz-Justice, Bucheli, Graw, Kielholz, Fisch, & Woggon, 1986). SAD affects persons from all socio-economic levels and all ethnicities (Rosenthal, 1989). Approximately six percent of the population in the United States suffers from SAD while nearly 14% suffer a milder form of the symptoms (Rosenthal, 1989). These statistics and prevalence rates indicate that SAD is not an uncommon occurrence and is probably under diagnosed (Garvey, Wesner, Godes, 1988).

Symptoms which may be present are: (a) hypersomnia (increased sleeping), (b) depressed mood, (c) diminished activity, (d) anergia [lack of energy], (e) hyperphagia (insatiable craving for food), (e) carbohydrate craving, (f) significant weight gain, (g) decreased sex drive, (h) tendency to socially withdraw, (i) decreased decisional abilities, (j) low motivation, and (k) difficulty with information processing and concentration (Rosenthal, 1989). The symptoms most frequently seen in the diagnosis of SAD are: (a) hyperphagia, (b) anergia, (c) carbohydrate craving, (d) hypersomnia, and (e) depressed mood. These symptoms generally remit in the spring (mid-February to mid-April) and usually disappear if the client goes south. At least three disturbances must have been experienced in separate years of which two were in consecutive years. Seasonal occurrences of the depressed mood must have also occurred more frequently than nonseasonal occurrences by three to one (DSM-III R, 1987).

The terms seasonal affective disorder (SAD), seasonal depression and winter depression will be used interchangeably in this thesis to provide variety.

Hypomania refers to a moderate level of mania and excitement with a mild change of behavior which does not interfere with the person's normal living (Thomas, 1985). Euthymic mood is defined as normal range of mood (Kaplan & Sadock, 1985).

Cognitive restructuring is defined as the modification of a person's thinking, including the beliefs, attitudes and assumptions that affect the thinking process. The primary focus of cognitive restructuring is upon the illogical or irrational cognitions which become problematic for the individual (Meichenbaum, 1977).

Phototherapy refers to the administration of 10,000 Lux of full spectrum light. These full spectrum lights duplicate the wave lengths present in natural sunlight minus the ultraviolet rays that are potentially harmful (Owens, 1990).

Problem solving is a cognitive learning process in which a specific problem is identified, potential alternatives are determined and a possible effective solution is selected (D'Zurilla & Goldfried, 1971). This approach is seen as a goal-oriented pattern of affective and cognitive processes with behavioral responses as a way of adapting to problematic situations of daily living (Heppner & Krauskopf, 1987; Nezu & Ronan, 1988).

Reframing means that a different meaning can be attached to a situation or experience without changing the concrete facts. This changed meaning can alter the consequences of the situation to the involved participant
(Bandler & Grinder, 1982; Watzlawick, Weakland & Fisch, 1979). Reframing is a means of altering the perspective one has of a situation which then allows a completely new approach to a problem by changing the meaning of that problem. Reframing is more concerned with a person's perceptions than with their cognitions (Brack, Brack, & Clodfelter, 1990).

Significance of the Study

If students suffering from Seasonal Affective Disorder can be effectively treated by the use of phototherapy, campus counseling centers may be able to provide more cost effective treatment for an increased number of students. Phototherapy could help minimize prolonged waiting periods by students for treatment of depression. This study will help determine if purchase of the special high intensity lights needed to provide phototherapy is prudent. Providing students with an effective means to eliminate or ameliorate the symptoms of depression associated with SAD will enable the students to have a positive effect on their academic success, as well as their social and personal lives.

Limitations

One of the problems with this study was the inability to randomly select participants. Subjects were acquired by

volunteering to participate in the research. They had perceived seasonal symptoms of depressed moods and associated biological symptoms and expressed their desire to seek alleviation of these symptoms. The difficulty in obtaining an acceptable sample size was another problem.

CHAPTER II

Literature Review

Seasonal Affective Disorder

Three types of seasonal depression have been identified: (a) winter depression with or without hypomania in the summer; (b) summer depression with or without hypomania in the winter; and (c) a combined type that may or may not have hypomania in the spring or fall (Rosenthal, 1989; Wehr, Rosenthal, & Sack, 1988). In the Punjab of north India, Gupta (1988) also made similar identifications of three separate seasonal depressions. Only winter depression will be examined here; however, summer depressions do bring into question whether the seasonal variable of duration of environmental light is indeed the factor causing winter depression (Murray, 1989).

Researchers (Lewy, Kern, Rosenthal, & Wehr, 1982) were able to plot a 63 year old male's seasonal mood cycling over a 13 year period by evaluating his diaries and log books. This individual's bipolar depression alternated with hypomania in a seasonal pattern. Depression would occur in the fall and winter while hypomania would occur in the spring and summer. This gentleman was experimentally administered bright light after he did not respond to traditional pharmocological therapy. After four days of exposure to phototherapy, the patient's symptoms of depression abated. The results of this case study led to the research of seasonal affective disorder and the mechanism of action in phototherapy.

Phototherapy evolved as a treatment for winter depression due to the hypothesis that light is a 'zeitgeber' (time cue) for circadian and seasonal rhythms (Arendt & Broadway, 1987; Wirz-Justice, 1986). The timing of changes that generate daily and seasonal rhythms is regulated and coordinated by the hypothalamus (Wehr, Rosenthal, & Sack, 1988).

Light entering the eye alters the brain chemistry in a manner which corrects a light deficiency abnormality in susceptible individuals (Rosenthal & Wehr, 1987). Information about changes in the amount of daylight are conveyed via the retinal/hypothalamic tract on to the suprachiasmatic nucleus which is then relayed to the pineal gland. The pineal gland monitors the production of melatonin, increasing at night and diminishing in daytime (Sack & Rosenthal, 1987). The therapeutic effect of the phototherapy showed that the melatonin secretion in humans can be suppressed by bright artificial light which could indicate a positive effect in the reduction of depressive symptoms produced by phototherapy.

An early phototherapy study (Rosenthal et al., 1984) supported the findings that phototherapy has an ameliorating effect for depression associated with SAD by the suppression of melatonin. Twenty-nine patients who: (a) met the criteria for the diagnosis of major affective disorder as outlined in Research Diagnostic Criteria (Endicott & Spitzer, 1978) and (b) experienced at least two consecutive years in which depression occurred in late fall and subsided in the spring, were admitted into the SAD research study. Patients were administered bright

white, full spectrum artificial light and dim yellow fluorescent light. After being exposed to the bright light, most of the patients self-reported improved moods and depressive symptoms appeared to be clinically improved also. Additionally, Hellekson, Kline, and Rosenthal (1986), in a pilot study conducted in Alaska, found benefits of the use of phototherapy on six patients who were diagnosed with SAD.

Pande (1985) noted in a case study in London, Ontario, Canada that a university professor who suffered annual depressions beginning in October experienced hypomania after two days when he attended a conference in California. When he returned to Canada, his symptoms returned. Notation of this response to increased light exposure supports the theory of winter depression remitting with increased light exposure.

Hypotheses

Four main hypotheses of the cause of seasonal affective disorder currently being studied are: (a) the role of melatonin production (Dranov, 1985; Rosenthal et al., 1985; Sack & Rosenthal, 1987), (b) photon counting (James, Wehr, Sack, Parry, & Rosenthal, 1985), (c) circadian phase shift (Czeisler et al., 1989; Lewy, Sack, Singer, White, & Hoban, 1988), and (d) neurotransmitters (Blehar & Rosenthal, 1989; Wirz-Justice, 1986).

Melatonin production.

Animal models have served as inspiration for the theoretical base of the research for SAD and phototherapy (Blehar & Rosenthal, 1989). In both diurnal and nocturnal animals, production of melatonin is inactive during the day. Melatonin

production begins at dusk and ceases at dawn. Animals experience seasonal changes of behavior such as migration, hibernation and reproduction which are triggered by photoperiodism (timing of light) instead of change in day length. Photoperiodism is the regulatory mechanism in animals' circadian rhythms which are influenced by nocturnal melatonin secretions (Wehr et al., 1986; Wirz-Justice, 1989). Light administered in the morning appears to delay the onset of melatonin secretion while evening light advances the start of this hormonal secretion (Winton et al., 1989).

Research was conducted on eight males to determine if phototherapy administered for five minutes would affect melatonin secretion (Byerley et al., 1989). Secretion of melatonin was ascertained by blood levels taken at frequent intervals. The reported data indicated that bright light exposure did suppress secretion of this pineal hormone which would promote an antidepressant effect in seasonal depression. Also, blood levels drawn on ten normal subjects during the night while being exposed to different intensities of light demonstrated that bright artificial light (2500 lux) causes inhibition of melatonin secretion (Boyce & Kennaway, 1987).

Later studies, however, do not support the view that melatonin levels contribute to the symptoms of depression in SAD or that phototherapy alters the levels of melatonin (Arendt & Broadway, 1987; Sack & Rosenthal, 1987; Wirz-Justice, 1986; Wirz-Justice, Bucheli, Graw, Kielholz, Fisch, & Woggon, 1986). Melatonin does not seem to be a major contributing factor in

seasonal affective disorder but altering the timing of melatonin secretion may prompt an antidepressant effect. Phototherapy, however, was found to be effective in the treatment of SAD (Murray, 1989).

Photon counting.

The total amount of light exposure (photon counting) may be a critical factor in the photo-periodic mechanism in the treatment of winter depression (Isaacs, Stainer, Sensky, Moor, & Thompson, 1988; James, Wehr, Sack, Parry, & Rosenthal, 1985; Wirz-Justice, Buchili, Schmid, & Graw, 1986). Grota, Yerevanian, Gupta, Kruse, & Zborowski (1989) found that subjecting participants to light for two hours after dusk, to increase the amount of light experienced within a day, obtained an antidepressant effect which substantiates the photon theory. Additionally, a study (Winton et al., 1989) conducted in the United Kingdom with ten SAD patients concluded that the total amount of light administered seemed to be of critical importance. This finding supports the photon counting theory.

Circadian phase shift.

Humans are subject to biological rhythms that are cued by sunlight but are not affected by ordinary indoor lighting (Lewy, 1987; Lewy, Sack, Singer, White, & Hoban, 1989). Abnormal circadian rhythms seem to cause depression during the winter in some patients according to a hypothesis postulated by Lewy, Sack, Miller, and Hoban (1987). This abnormality of rhythms can be corrected by exposure to bright light and consequently, an antidepressant effect is experienced. Lewy, Sack, Singer, White,

and Hoban (1988) have noted that shifting circadian phase positions are affected by exposure to bright light in the evening which delays pineal hormone melatonin production while bright light in the morning advances production. Jacobsen, Wehr, Skwerer, Sack, & Rosenthal (1987) suggest that there may be an individual circadian sensitivity to light rather than an actual circadian phase shift.

Lewy (1987) suggests that subjects be typed as to whether they are phase advanced or phase delayed. A phase advanced cycle indicates a phase that has shifted to an earlier time while a phase delayed cycle is one which has shifted to a later time. Once the phase typing has been determined, bright light can be administered appropriately. Phototherapy given in the mornings would advance (or shift the phase to an earlier time) while bright light in the evening would delay or shift the phase to a later time (Lacoste & Wirz-Justice, 1987). Alternatively, investigators (Murray, 1989; Wehr et al., 1986) have found little evidence that disturbed circadian rhythms is a major factor in seasonal depression.

A related hypothesis that has been advanced, but has not been tested, is the circadian rhythm amplitude theory (Wehr & Rosenthal, 1989). Depression in the winter is thought to be caused by a decrease in the amplitude of the circadian rhythms. Phototherapy apparently can increase the circadian rhythm amplitude, thereby, improving the seasonal depression. Research to test this hypothesis is indicated.

Neurotransmitters.

Abnormalities of neurotransmitter regulation such as plasma norepinephrine levels, dopamine functioning, elevated prolactin levels, serotonergic production and plasma cortisol levels are areas of current research (Blehar & Rosenthal, 1989; Wirz-Justice, 1986). Since neurotransmitters interact in complex ways, it would be naive to assume that just one neurotransmitter is responsible for the symptoms of seasonal depression (Rosenthal et al., 1985). At present, consensus seems to establish that the biological basis of SAD and the mechanism of phototherapy are interrelated, however, the research is inconclusive and, in many cases, the results conflict. Further research is being conducted to understand what relationship exists between these neurotransmitters, phototherapy and seasonal depression.

Twenty subjects with winter depression were administered a small dose of dexamethasone, a synthetic steroid, to determine if SAD patients would respond in the same way that patients with endogenous depression respond.
Endogenous depression is diagnosed by a failure to suppress plasma cortisol with dexamethasone. In this study (James et al., 1986), the SAD patients were found to suppress plasma cortisol levels. These findings may be of benefit in differential diagnosis, however, the value of diagnosing endogenous depression exclusively by using the dexamethasone suppression test has been disputed (Murphy, 1981).

Another theory that has recently been addressed in the literature involves the role of vitamin D and calcium in

mediating the antidepressant effect of phototherapy. This premise purports that soltriol (vitamin D or steroid hormone of sunlight) is the endocrine messenger of sunlight located in the skin. This messenger transmits the zeitgeber in harmony with vital functions of the body to conditions of the environment and aids in adaptation for growth, development and reproduction (Stumpf & Privette, 1989). These researchers advocate studies to include the effects of calcium and vitamin D and the relationship with the complex endocrine system. These questions are new and extensive research will need to be completed before answers are forthcoming.

Phototherapy

Ten patients were exposed to light therapy to determine whether the light was mediated by the skin or by the eyes (Wehr, Skwerer, Jacobsen, Sack, & Rosenthal, 1987). One subject group exposed their legs, arms, face and neck to light while their eyes were shielded by goggles. The second group covered their skin with cloth and only their eyes were exposed to phototherapy. Exposure of the eyes to phototherapy was clearly superior to exposure of the skin, although, one of the subjects responded more to exposure of the skin. This data suggests that the antidepressant effect of phototherapy is mediated via the eyes although it is unknown what photoreceptors in the retina are responsible for transmitting the effective rays of the light (Joseph-Vanderpool & Rosenthal, 1988). It must be kept in mind that some clients may benefit from skin exposure to light.

Sixteen SAD patients were exposed to phototherapy that varied in intensity but not brightness or wavelength (Grota, Yerevanian, Gupta, Kruse, & Zborowski, 1989). Depression scores assessed by the Hamilton Rating Scale for Depression and the Beck Depression Inventory were reduced more for those exposed to high intensity light and also, those who were exposed to the higher intensity light resisted relapse longer. Females appeared to have a stronger response to the phototherapy than males in the study. This observation may be significant as it may indicate a higher sensitivity to light in the environment by females and may explain the greater number of females affected by SAD.

The most recent literature (Murray, 1989; Wehr, Rosenthal, & Sack, 1988) has shown that bright artificial light can effectively treat seasonal affective disorder, however, the optimal timing of the administration of these treatments is controversial as is the reason for treatment effectiveness. Lewy, Sack, Miller, and Hoban (1987) demonstrated the superiority of exposing subjects to light treatment in the morning hours. The most effective time of morning therapy has not been established (Hellekson, Kline, & Rosenthal, 1986; Rosenthal, Rotter, Jacobsen, & Skwerer, 1987).

Wehr et al. (1986), found in a study involving seven patients who were placed in a cross-over design which assessed various time schedules, that the timing of the phototherapy did not establish one time (morning, noon or evening) as being superior. While antidepressant effects were noted, the timing of the therapy was not a factor.

Research studying the effects of phototherapy administered in the mornings found patients appeared to respond significantly to morning light therapy (Blehar & Rosenthal, 1989; Byerley, Brown, & Lebegue, 1987). Morning phototherapy seems to have an antidepressant effect in SAD because it apparently corrects abnormal circadian rhythms. Light administered in the early morning is thought to advance the circadian rhythm phase while light given in the evening supposedly delays the phase. According to this theory, individuals subjected to light around noon would experience no effect, however, there have been findings (Rosenthal, Sack, Skwerer, Jacobsen, & Wehr, 1988; Terman, 1988) that do show an antidepressant effect when light is administered at midday. The circadian rhythm phase shift theory has not been totally supported by the research (Lewy et al. 1989).

Timing of the exposure to phototherapy does not seem to a critical factor. Research conducted in Australia (McInyre, Armstrong, Norman, & Burrows, 1989) on a subject pool of six found an improvement on the Hamilton Depression Rating Scales, SAD version, after exposure to 2 hours of full spectrum light in the evenings. James, Wehr, Sack, Parry, and Rosenthal (1985) found evening light exposure beneficial in antidepressant effects in the treatment of nine female winter depression patients. Light administration has been found to be effective at morning, midday or evening, however, late evening exposure is contraindicated because it may cause insomnia or hyperactivity (Wirz-Justice, 1986).

In a review of 29 phototherapy studies, Terman et al., (1989) found that exposure to bright light in the mornings was superior to other administration times although positive responses were obtained at other times.

To determine if phototherapy has an effect only on depressed clients, research needed to be conducted on nondepressed individuals to ascertain what effect phototherapy had on their moods. Rosenthal, Rotter, Jacobsen, & Skwerer (1987) found phototherapy administered to 22 normal subjects to be ineffective in altering participant's moods. Eleven of these normal subjects were exposed to 2500 lux lights 2 hours each morning while another 11 normals were given dim 300 lux light therapy. No significant differences in mood changes were noted as a result of these therapies. This data was supported by subsequent research (Kasper, Rogers, Madden, Joseph-Vanderpool, & Rosenthal, 1990; Kasper et al., 1989). These results could imply that phototherapy in some way corrects a biochemical abnormality in people suffering from SAD (Kasper et al., 1989). Other research conducted by Kripke, Mullaney, Savides, & Gillin (1989) found that nonseasonal depressives did respond to phototherapy with an alleviation of symptoms of depression and this suggests that phototherapy may have palliative effects on depressions of other etiologies.

Recruitment for a study (Wirz-Justice et al, 1986) conducted in Switzerland with a Swiss-German population identified a rather large number of SAD patients. Twenty-

two patients were selected for the study in a manner which closely replicated studies by Rosenthal's research team. Improvement of depressive symptoms was noted when subjects were exposed to both bright white and dim yellow lights but the bright lights were more effective initially and for a longer time. A placebo effect was not ruled out but was not given much support either.

In a study (Isaacs, Stainer, Sensky, Moor, & Thompson, 1988) conducted with 11 depressed SAD patients, three treatments with light of varying intensity (light supplement with bright light or extension of photoperiod with bright light or dim light) produced antidepressant results for all three conditions. Bright light did, however, produce a slightly greater effect in improving symptoms of depression. Response to all levels of light conditions is in contrast to the majority of the research.

Stinson and Thompson (1990) noted in their study of 30 SAD patients in the United Kingdom that patients with more endogenous components (e.g., higher scores on the Hamilton Depression Rating Scales as compared to the SAD scores) to their depression seemed to respond poorly to phototherapy. Patients who rated higher on atypical symptoms which are the specific SAD symptoms as assessed by the Hamilton Depression Rating Scale-SAD version responded more favorably to bright light therapy which indicates that phototherapy is an effective choice of treatment for SAD. This research group also noted higher remission rates among subjects who were mildly depressed as compared with those more severely depressed.

Duration of light treatment has also met with controversy. Length of treatment has varied from 30 minutes to 5 hours with varying therapeutic responses (Doghramji, Gaddy, Stewart, Rosenthal, & Brainard, 1990; Hellekson, Kline, & Rosenthal, 1986; Lewy, Sack, Miller, & Hoban, 1988; Wirz-Justice, 1987). To date no definitive conclusion has been reached regarding the length of light treatment. The most recent research seems to indicate that higher intensity lights can be used for shorter periods of time with equally positive results.

Phototherapy may work by complex mechanisms which differ in different individuals (Murray, 1989; Skwerer et al. 1989). It has not been established what spectral qualities of the full spectrum lights are responsible for the antidepressant effects noted in therapy (Blehar & Rosenthal, 1989; Rosenthal, 1989; Wehr, Rosenthal, & Sack, 1988). Some subjects respond more positively to morning light while others respond more to evening light exposure which suggests that some type of phase identification would be appropriate in future research and therapy (McIntyre, Armstrong, Norman, & Burrows, 1989). Therefore, it seems that designing light therapy to each individual's specific needs will be a critical aspect of future therapeutic treatment (Kripke, Risch, & Janowsky, 1983). Another view is that the phototherapeutic mechanism of action is the correction of a biochemical deficit (Kasper et al., 1989). Further research with more sophisticated techniques will be needed before definitive answers are forthcoming to the questions

of pathophysiology of SAD and the mechanism responsible for the effectiveness of phototherapy (Byerley, Brown, & Lebegue, 1987).

Timing and duration of light administration are matters of clinical judgment. The clinician must begin with a time that is convenient for the subject. After the first four days, modifications can be made if necessary (Rosenthal & Wehr, 1987). To determine whether modifications are necessary, the clinician can administer the SIGH-SAD or a BDI in conjunction with the client's subjective assessment.

Phototherapy usually alleviates symptoms of winter depression within two to five days and relapse occurs within the same amount of time when therapy is terminated (Murray, 1989; Rosenthal et al., 1985; Wehr, Rosenthal, & Sack, 1988). Therefore, a clinical decision can be made whether modifications of the phototherapeutic treatment is required.

Terman (1988) demonstrated the efficacy of 10,000 lux intense light in producing an antidepressant effect with exposure time of 30 minutes. Shorter periods of exposure are advantageous for individuals with busy schedules or who find longer exposure times unmanageable. Since 10,000 lux lights are new on the market, clinicians and clients have the option of deciding which intensity of lights they want to employ for the client's specific needs. This study (Terman, 1988) was the first to examine the effectiveness of the 10,000 lux lights.

Subjects with higher seasonality scores on the Seasonal Pattern Assessment Questionnaire (SPAQ) respond more favorably to phototherapy which may prove to be a valuable tool in determining

the people who would most benefit from phototherapy (Kasper et al., 1989). Using the SPAQ as a diagnostic indicator to identify persons who have high seasonality scores may be an effective method of conducting an initial cursory screening to determine clients who would be appropriate for an evaluation by a psychiatrist prior to prescribing necessary treatment.

Side effects.

Side effects of phototherapy are uncommon. However, those that have been noted are: headaches, nausea, eye strain, irritability, overactivity, fatigue and insomnia (Rosenthal, 1989, Wirz-Justice, 1986). There have been no adverse opthalmological effects noted from phototherapy (Yerevanian, Anderson, Grota, & Bray, 1986). No long term deleterious effects have been noted from phototherapy (Rosenthal, 1989; Wehr & Rosenthal, 1987).

Subsyndromal Seasonal Affective Disorder

Research conducted at the National Institute of Mental Health (Kasper et al., 1989; Kasper, Rogers, Madden, Joseph-Vanderpool, & Rosenthal, 1990; Kasper, Wehr, Bartko, Gaist, & Rosenthal, 1989) has established the existence of a subsyndromal SAD that responds to phototherapy. The prevalence of sub-SAD ranges from 2.6% in Florida to 11% in New Hampshire (Bower, 1989). The symptoms of SAD vary in degree across the population from those who are unaffected by the seasons to those who are severely affected (Hardin et al., in press; Kasper et al., 1989; Terman, 1988). Those who are moderately affected or who only partially meet the criteria for seasonal depression are

considered subsyndromal. Both groups, those who meet criteria and those who are subsyndromal, have responded favorably to phototherapy (Hardin et al., in press; Kasper et al., 1989; Kasper, Wehr, Bartko, Gaist, & Rosenthal, 1989).

Prevalence

A questionnaire published in a national newspaper which asked yes-no responses to 15 symptoms that defined SAD was utilized to determine the prevalence of Seasonal Affective Disorder by latitude (Potkin, Zetin, Tamenkovic, Kripke, & Bunney, 1986). Responses to this questionnaire that met the DSM-III R criteria were subjected to more intense scoring and information gathering. The data, which may be limited in reliability because it was based on self-report, suggested a highly positive correlation between symptoms of seasonal depression and higher latitude and greater cloudiness. Other researchers (Potkin, Zetin, Tamenkovic, Kripke, & Bunney, 1986; Wirz-Justice, 1986) have found a highly negative correlation between the average lower December temperatures and shorter daylight hours, and winter depression symptoms. These results indicate a higher risk of SAD in the northern climates. Air temperatures and the individual's sensitivity to light are two more factors which may be cause for future research (Arendt & Broadway, 1987; Boyce & Parker, 1988; Joseph-Vanderpool & Rosenthal, 1988; Murray, 1989). Mental health care providers located in higher latitudes will especially need to consider SAD in diagnosing depressions occurring in the fall and winter, and will want to consider phototherapy as a treatment of choice.

Studies of seasonal affective disorder have been reported in the southern hemisphere (Boyce & Parker, 1988; Wirz-Justice, 1986). The onset occurs in fall/winter and abates in the spring/summer. These researchers noted a preponderance of women sufferers who had the characteristics of symptomatology and demographics that were found to be similar to those found in studies conducted in the northern hemisphere. Australia's winters are milder than the winters in Maryland where the bulk of the seasonal depression studies have been conducted, therefore, temperature does not seem to be a factor to the onset of seasonal depression, although further research is indicated. The midwinter photoperiod in Sydney is 590 minutes while Rockville, MD's photoperiod is 560 minutes. Since these photoperiods are similar, there appears to be support of the hypothesis that photoperiod is an important environmental factor in seasonal affective disorder. Apparently the degree of a person's adaptation to a shortened winter photoperiod is of significance in the etiology of this disorder.

In a study comparing the prevalence rates of SAD in four different latitudes (New Hampshire, New York, Maryland and Florida), higher incidences of winter depression were noted in the northern latitudes (Rosen et al., 1990). The rates were 9.7%, 4.7%, 6.3% and 1.4% respectively. The Maryland area has been surveyed previously and a preponderance of the SAD research has been conducted at the NIMH located in Maryland which may account for the higher incidence reporting in that state. The higher prevalence rate in northern climates noted in this study

seem to support the hypothesis that deprivation of light is a major factor in SAD (Kasper, Wehr, Bartko, Gaist, & Rosenthal, 1989).

Seasonality in Other Disorders

. Seasonality also seems to be a component of some other disorders. Bulimics have been noted to present with exacerbation of their binge-eating in the fall and winter (Rosenthal, Genhart, Sack, Skwerer, & Wehr, 1987). Phototherapy studies have not been conducted yet to ascertain whether bright light would have an ameliorating effect on this eating behavior.

In a case study (Parry, Rosenthal, Tamarkin, & Wehr, 1987) of a 24 year old female who experienced severe premenstrual depressions only in the fall and winter, it was found that the patient's symptoms reversed after being treated with phototherapy. While the results of a case study are not generalizable, this data may offer hope for premenstrual syndrome sufferers and is fertile ground for future research.

A study (Lewy et al., 1985) conducted with euthymic manic-depressives showed a supersensitivity to light in addition to melatonin production suppression. This finding suggests that supersensitivity to light may be a trait marker for manic-depression and possibly other affective disorders. Rosenthal et al., (1984) noted that 4-5% of manic-depressive patients have a seasonal component to their illness. The cycling noted in manic-depressives may be an important consideration in diagnosing bipolar patients by determining if the etiology is endogenous, environmental influences or an interaction of the two

(Kripke, Risch, & Janowsky, 1983; Rosenthal, Lewy, Wehr, Kern, & Goodwin, 1983).

Bick (1986) has noted a definite seasonal cycling after evaluating four case studies of identified bipolar disorder patients that ranged from mild to severe. In diagnosing bipolar patients, an important consideration may be to note their manic-depressive cycling to determine if it is seasonally patterned. Bick suggests that bipolar patients be questioned regarding the seasonality of their symptoms as there may be implications for the suggestion of light therapy as the treatment of choice or in conjunction with pharmocotherapy.

Questions Regarding Seasonal Affective Disorder

Approximately 42% of adult SAD sufferers report the onset of their symptoms occurring in early childhood or adolescence. Seven children with a mean age of 12 years were treated with varying intensities of light therapy (Rosenthal et al., 1986). All seven responded favorably to phototherapy. Some of the children had better results with lower intensities which could indicate varying sensitivities to light which in future research or treatment would need to be evaluated to ascertain appropriate light levels.

With all of the current documentation of SAD as a demonstrable disorder, there are skeptics who are concerned whether this is a valid phenomenon. Eastwood & Peter (1988) question the validity of Seasonal Affective Disorder as a reality since most people studied are self-selected and may be responding to the light therapy because of a placebo effect and the

subjects' suggestibility. Other researchers (Isaacs, Stainer, Sensky, Moor, & Thompson, 1988; King, 1986) also express concern regarding the possibility of a placebo effect. There is no way to control for the placebo effect phenomenon with phototherapy so this must be considered as a potential factor when evaluating the therapeutic effect of phototherapy. Rosenthal and James (1986) dispute the notion that the placebo effect is responsible for the effectiveness of phototherapy because (a) cross-over designs are used which allow for a wash-out time, (b) repeated studies have shown phototherapy to be effective, (c) response to bright and dim light has been consistent through all reported studies, and (d) if indeed a placebo effect exists, the response would likely be quicker than the 2-4 days that is usual. Additionally, Terman (1988) questions how data from studies that frequently have small sample numbers can be generalized to the overall population.

Another consideration that has been addressed in the literature is the subjects' expectations about the offered therapy since it may affect their response or contribute to the outcomes (Lewy, 1987; Rosenthal et al, 1985). Jacobsen, Wehr, Skwerer, Sack, & Rosenthal (1987) found no support that expectations affected the outcome of response to therapy; however, this is a factor that does bear careful consideration when evaluating the subject's response.

Cognitive Therapy

In the treatment of depression, cognitive therapy has been found to be effective (McNamara & Horan, 1986). Notable improvement has been attained within the relatively short time of

two weeks in studies that use cognitive therapy in conjunction with pleasant events (Dobson & Jaffe, 1986; Shaw, 1977). Cognitive therapy, used in conjunction with behavioral therapy, has been shown to be effective in the treatment of moderately depressed adolescents (Reynolds & Coats, 1986).

Rehm, Kaslow, & Rabin (1987) found the combined cognitive-behavioral approach efficacious for a wider age range of subjects suffering from depression. This study consisted of a ten week program conducted with women ranging in ages from 18-60. Other studies (Hogg & Deffenbacher, 1988; Zeiss, Lewinsohn, & Munoz, 1979) have determined that combined approaches utilizing cognitive therapy are effective in alleviating symptoms of depression and in improving the client's sense of effectiveness in conjunction with one or more of the following: (a) interpersonal- process, (b) interpersonal skills training, or (c) pleasant activity schedules.

Rush, Beck, Kovacs, & Hollon (1977) studied a group of 41 patients to determine the efficacy of cognitive therapy as compared to pharmacotherapy. Both treatment modalities resulted in significant improvement in depressive symptoms; however, subjects who had received cognitive therapy seemed to have superior results to those receiving antidepressants. These data were the results of self-reports and clinical assessments.

In a study conducted to determine individuals whose depressive symptoms are most likely to improve with cognitive behavioral therapy, the results indicated that persons who persevere in situations that are challenging are more likely to

be successful in overcoming depression. Perceptions of self-efficacy were noted to be higher when subjects were feeling in control of their lives and were not experiencing symptoms of depression (Mahalik & Kivlighan, 1988). They feel more able to persevere in difficult situations.

Cognitive therapy has been acknowledged and accepted as an effective method of treating depression. Its effectiveness in alleviating the symptoms of seasonal affective disorder is untested.

Problem Solving

In recent years, researchers have delved into the effect that problem solving skills has on the clients' ability to cope with stressful situations (Heppner, 1978). Deficits in problem solving skills appear to be more significant in interpersonal or social problems than in hypothetical, impersonal problems (Heppner & Krauskopf, 1987). Recent data reveal that individuals who have symptoms of depression experience greater deficits in problem solving ability (Gotlib & Asarnow, 1979; Heppner & Anderson, 1985; Nezu, 1986b; Nezu & Ronan, 1988).

Good problem solvers who viewed themselves as effective in their abilities also reported being more socially comfortable and felt they were better managers than poor problem solvers perceived themselves. Self-identified ineffective problem solvers reported having emotional problems that required help or outside intervention (Heppner & Anderson, 1985). These ineffective problem solvers were diagnosed with higher levels of

depression than their effective problem solver counterparts (Nezu & Ronan, 1988).

Inadequate problem solving skills are frequently associated with symptoms of depression. Depressed mood tends to heighten the potential for ineffective problem resolution which in turn exacerbates the depression. Depression seems to be heightened by a perception of inadequate social skills. Therefore, becoming more effective at interpersonal problem solving should help decrease the liklihood of experiencing depressive symptoms. Improving interpersonal competence is seen as an attempt to gain control over an individual's personal environment and overcome the effects of depression (Gotlib & Asarnow, 1979).

Twenty undergraduate students completed the Problem Solving Inventory (PSI), the Beck Depression Inventory (BDI), the Attribution Style Questionnaire (ASQ), and the Mooney Problem Checklist for a study conducted by Heppner, Baumgardner, & Jackson (1985). Students, who related more personal problems rated themselves as lacking confidence, less personal control, and having adapted an avoidance style toward problem solving, were also noted to have more depressive symptoms.

Heppner, Reeder, & Larson (1983) found that students who self-attribute as effective problem solvers also rate themselves as having higher positive self-concept than those who view themselves as ineffective problem solvers.

Krauskopf and Heppner (1988) advocate a thorough examination of the client's process of problem solving in daily life. It is essential to evaluate how the individual copes with problems from

daily hassles to major concerns (Heppner, 1978). When a deficit in problem solving skills is identified, strategies then can be developed to improve those skills. Problem solving is an area of counseling that can be used to promote the development of more effective coping skills for clients.

The relationship between problem solving appraisal and symptoms of depression was examined in a college campus population (Nezu, 1986b). Students who perceived their ability to solve problems as ineffective were more likely to experience depressive symptoms. Unfortunately, there is no consensus as to which comes first, the depression or the perception of ineffective problem solving. Even though causality has not been established, Nezu (1986b) has shown that improvement of problem solving skills does ameliorate the effects of depression.

Nezu (1986a) found the problem solving approach to be effective in reducing symptoms of depression. In a study of 32 subjects, 12 were assigned to problem solving therapy, 11 were placed in problem-focused therapy and 9 were on a wait-list control. The problem solving therapy (PST) group consisted of a systematic approach to coping with problems while the problem-focused therapy was less structured and was conducted in a group discussion format. Subjects who participated in PST experienced substantial reduction of their depression as measured by Beck Depression Inventory scores, and this reduction was maintained on a six month follow-up. It appears that improving coping skills enables the individuals to feel a greater control in their lives and lessens the liklihood of depression.

Reframing

Research on reframing has been limited. Reframing allows the individual to perceive a problem or situation in a different context and once this is accomplished, the old perceptions are difficult to maintain. The client is then able to exchange new, more functional ways of coping for dysfunctional approaches that have lost effectiveness.

Conoley and Garber (1985) conducted a study regarding the effectiveness of reframing on loneliness and depression in college students. Reframing was found to have an ameliorating effect on depression by assisting subjects find solutions to the ways in which they have been maintaining their problems by (a) eliminating their emotional attachment to the problem, or (b) by changing their previous approaches. The reframing model has also been used successfully in overcoming patient resistance in a medical environment (LaClave & Brack, 1989). These results can probably be generalized to resistance encountered in the counseling setting. Brack, Brack, and Clodfelter (1990) have found the reframe approach to be particularly effective in their work with delinquent adolescents.

SUMMARY

A review of the literature supports the efficacy of phototherapy in the treatment of SAD, although the specific mechanism for that improvement remains unknown. Also, the etiology of seasonal affective disorder remains unknown. The primary hypotheses that are being considered in current research are: (a) the role of melatonin, (b) photon counting, (c)

circadian phase shift, and (d) abnormalities of neurotransmitter regulation.

Seasonal components appear to be a factor in other illnesses such as: (a) manic-depression, (b) bulimia, and (c) premenstrual syndrome. Further research needs to be conducted to fully understand what part seasonality plays in these illnesses.

Cognitive approaches (cognitive restructuring, problem solving and reframing) have been established as effective therapies in the treatment of depression. Although cognitive models are helpful in the treatment of depression, no research to date has been conducted to determine if cognitive therapy can be of value in the treatment of SAD.

Phototherapy can be a self-administered treatment for winter depression after proper evaluation by a qualified professional. Light therapy has few side effects, none of which appear serious, whereas, antidepressant medication frequently has side effects or gives incomplete relief from the symptoms of depression. The duration of light, time of day and intensity of light exposure must be determined by the clinician taking into consideration each individual's specific needs.

The etiology of seasonal affective disorder remains a mystery as does the mechanism of action of phototherapy. There seems to be substantial evidence that for those persons who suffer from SAD, phototherapy can offer relief of their symptoms.

CHAPTER THREE

Methodology

Sample

The sample consisted of four volunteers who were recruited from advertisements placed in the newspapers of three local universities and from referrals from the university counseling center. Subjects were recruited or referred on the basis of complaints of recurrent depression with a seasonal component. Each student was screened by the researcher and a psychiatric resident. These subjects were then randomly assigned to one of two therapy groups, phototherapy or cognitive therapy.

Measurements

The following instruments were used for data collection in this study: Beck Depression Inventory (BDI); Seasonal Pattern Assessment Questionnaire (SPAQ); Problem Solving Inventory (PSI); State-Trait Anxiety Inventory (STAI); Seasonal Screening Questionnaire; and Structured Interview Guide for the Hamilton Depression Rating Scale, Seasonal Affective Disorders Version (SIGH-SAD).

The Beck Depression Inventory (BDI) is sensitive to measuring the symptoms of depression (Kendall, Hollon, Beck, & Ingram, 1987). The BDI consists of a self-report assessment of 21 symptoms, on a 0-3 intensity scale, as a determination of the level of depression present. The internal consistency for the BDI has been found to be a mean coefficient alpha of .81 for

nonpsychiatric patients. The concurrent validity of the BDI compared to the Hamilton Psychiatric Rating Scale for Depression was .60 to .74 respectively with nonpsychiatric subjects (Beck, Steer, & Garbin, 1988). Other researchers have demonstrated significant correlation of the BDI with a number of other depression measures indicating strong concurrent validity (Corcoran & Fischer, 1987). The BDI split half reliability is .78 to .93 with good to excellent internal consistency. Test-retest reliability is .74 for undergraduate students after three months. The BDI is good to excellent in validity (Beck, Steer, & Garbin, 1988).

The Seasonal Pattern Assessment Questionnaire (SPAQ), is a screening instrument which evaluates retrospectively the degree of seasonal variation in behavior and mood (Rosen et al., 1990). The SPAQ consists of 18 statements which determine demographic information and the seasonal component to mood dysfunction. Published reliability appears fairly high on most items (Thompson, Stinson, Fernandez, Fine, & Isaacs, 1988). A greater reliability across time has been noted for those with higher degrees of seasonal change (Hardin et al., unpublished). The SPAQ has been found to successfully discriminate between SAD patients, nonseasonal bipolar depressives and normal subjects (Rosen, 1990; Thompson & Issacs, 1988). The validity of this questionnaire has not been thoroughly established (Rosenthal, Genhart, Sack, Skwerer, & Wehr, 1987).

The Problem Solving Inventory (PSI) consists of 35 statements to which a person responds on a 1-6 rating scale ranging from strongly agree to strongly disagree. The PSI assesses how the person perceives his or her problem solving capabilities by determining three factors: (a) problem solving confidence, (b) approach-avoidance style, and (c) sense of personal control. This inventory gives an indication of how subjects assess their own problem solving abilities (Heppner, 1986). The test-retest reliability for the Problem Solving Inventory was r=.89 and concurrent validity correlations were found to be statistically significant ($p < .0001$) by the test's author (Heppner, 1986).

There is no specific scoring system. Evaluation of improvement is determined by changes in the scores with lower scores indicating improvement (Heppner, 1986).

The State-Trait Anxiety Inventory (STAI) consists of 40 items, 20 of which assess how the client feels presently and 20 of which assess how the client feels in general (Buros, 1978). Each item can be evaluated on a four point rating scale ranging from not at all to very much so (Ramanaiah, Franzen, & Schill, 1983).

The test-retest reliability of the STAI trait scale for undergraduate college students is relatively high (ranging from .73 to .86), however, the reliability for the STAI state scale tends to be low. This low scale can be expected since it is designed to reflect situational influences. The

correlations of the STAI with other anxiety scales for college students is moderately high (.75 to .80) (Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983).

Alpha median coefficients for the State-anxiety scales were .93 and .90 for the Trait-anxiety scales. Alpha reliability coefficients of the State-anxiety scale were generally higher when given under conditions of psychological stress. Internal consistency was reported at .59 for college students. Construct validity was found to be relatively high. Scores on both scales were similar when given under nonstressful circumstances. However, when college students were tested while taking an exam, their State-anxiety scores were significantly higher; and after relaxation training, scores were notably lower (Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983).

In evaluating score results, scores over 75% are considered to have clinical implications (G. Brack, personal communication, March 7, 1989).

The Seasonal Screening Questionnaire (SSQ), an instrument developed at the National Institute of Mental Health, is utilized as an information collecting tool for detailed information about the subject. Information gathered includes: (a) data about recent problems that the subject has seen a counselor or therapist about, (b) specific symptomatology, (c) sleep patterns, (d) mood or energy levels, (e) the effects of differing light or changing geographical locations on moods, (f) medical and

medication history, (g) personal and family psychiatric history and, (h) for females, a detailed menstrual history.

The Structured Interview Guide for the Hamilton Depression Rating Scale, Seasonal Affective Disorders Version (SIGH-SAD), consists of 21 items that appraise symptoms of depression plus 8 items that assess SAD. These additional items evaluate social withdrawal, weight gain, appetite increase, increased eating, carbohydrate craving, hypersomnia, fatigability, and diurnal mood or energy slump. Each symptom is rated on a 0-4 scale with 0 being absent or normal and 4 indicating the most severe manifestation of the symptom. The SIGH-SAD, which contains the 8 additional SAD specific items, an addendum to the Structured Interview Guide for the Hamilton Depression Rating Scale (SIGH-D), has not had its validity and reliability established. However, the SIGH-D has shown excellent reliability and validity was established at .89 in a study conducted on a series of psychiatric inpatients (Cicchetti & Prusoff, 1983; Williams, 1988).

Treatment and Procedure

In initial screening, all subjects completed the following questionnaires prior to beginning the study: (a) Beck Depression Inventory; (b) Problem Solving Inventory; (c) State-Trait Anxiety Inventory; (d) Seasonal Pattern Assessment Questionnaire; (e) Seasonal Screening Questionnaire; and (f) the Structured Interview Guide for the Hamilton Depression Rating Scale, Seasonal Affective Disorders Version (SIGH-SAD). The BDI was

administered each week. The results of the BDI were then graphed for each subject. Participants were removed from the research study if the level of depression required additional clinical intervention. Subjects currently on antidepressants continued their current medication at the present dosage. Communication between the Moorhead State University staff psychiatrist and the researcher was maintained for consultation and for the benefit of the participants. The PSI, STAI, and SIGH-SAD were readministered at the end of the study.

Final screening prior to the study was conducted by an University of North Dakota psychiatric resident to determine whether the subject met the criteria for SAD and to screen out those subjects with psychosis, personality disorders and/or addictions. The Structured Clinical Interview for the Diagnostic and Statistical Manual of Mental Disorders (SCID), a structured interview tool, was used to elicit information necessary for this screening. Parenthetically, the SCID is used to distinguish between Axis I and II diagnoses in the DSM-III R (Kasper et al., 1989). Participants were then randomly assigned to one of the two groups (cognitive therapy or phototherapy).

Phototherapy, consisting of exposure to 10,000 lux high intensity full spectrum light, emitted from a metal box 2 feet by 4 feet through a plastic diffusing screen (Rosenthal, Rotter, Jacobsen, & Skwerer, 1987) was administered to Group 1. Each subject sat 16 inches from the light box for 30 minutes weekday mornings for six weeks. The time of exposure to the light

therapy was adjusted as necessary (e.g., longer exposure to light if no response was noted). Because of the angle of the mounted lights and proximity to the lights, the participants were able to read or visit and obtain maximum effectiveness from the lights. Group 2 received training in a three-part cognitive model composed of (a) reframing, (b) cognitive restructuring, and (c) problem solving. The subjects in the cognitive group met weekly for an hour for six weeks.

Type and Level of Measurement

The scores of the Beck Depression Inventory; Problem Solving Inventory; State-Trait Anxiety Inventory; and Structured Interview Guide for the Hamilton Depression Rating Scale, Seasonal Affective Disorders Version administered prior to the study and at the conclusion were analyzed by repeated measures analysis. Significance level was set at $p<.05$.

Design

The treatments of phototherapy and cognitive therapy were the independent variables in this research. The dependent variables were the scores of the inventories that were administered as pre and post tests. These scores were analyzed by a repeated measures T-test. BDI scores were monitored on a weekly basis. The additional scores were not analyzed but were collected for clinical purposes.

CHAPTER IV

Results

There was some improvement on pre versus post test for the cognitive group on the Hamilton Depression Rating Scale of the SIGH-SAD but this was not statistically reliable, $t\ (3) = 2.00$, $p>.05$. as shown on Table 1.

Table 1

Mean Scores of the Hamilton Depression Rating Scale; SAD Scales of the Hamilton; Beck Depression Inventory, Problem Solving Inventory and State-Trait Anxiety Scores by Pre/Post Test by Cognitive Therapy Versus Phototherapy

	Pretest		Posttest	
	Cog	Photo	Cog	Photo
HAM	23	12	9	9
SAD	21	11.33	14	12.33
BDI-1	25	21	6	13
BDI-2	25	21	9	13.33
PSI-1	33	34.67	29	27.33
PSI-2	64	42	38	40.67
PSI-3	19	19.67	18	19
PSI-TOT	116	96.33	85	87
STAI-S	59	93	87	79.33
STAI-T	86	90	91	85.33

Note:
HAM = Hamilton Depression Rating Scale
SAD = Seasonal Affective Disorder Scales of the HAM
BDI-1 = Beck Depression Inventory completed final week
BDI-2 = Beck Depression Inventory completed one week later
PSI-1 = Problem Solving Inventory, Problem Solving Confidence
PSI-2 = Problem Solving Inventory, Approach-Avoidance
PSI-3 = Problem Solving Inventory, Personal Control
PSI-TOT = Problem Solving Inventory Total
STAI-S = State-Trait Anxiety Inventory, State

STAI-T = State-Trait Anxiety Inventory, Trait

The results are significantly affected by the small number of subjects in this study. There was also a slight improvement on pre versus post scores for the cognitive group on the Seasonal Affective Disorders (SAD) scales of the SIGH-SAD but this also failed to reach significance,
$t(3) = .37$, $p>.05$. A significant improvement was found on the pre versus final week post Beck Depression Inventory (BDI) scores, $t(3) = 3.75$, $p>.05$. This improvement was maintained at one week later on the pre versus post BDI scores $t(3) = 4.20$, $p>.05$. Little or no improvement was indicated on the pre versus post scores on the Problem Solving Inventory: Problem solving confidence, $t(3) = 1.77$, $p>.05$; Approach-avoidance, $t(3) = 1.07$, $p>.05$; Personal control, $t(3) = .73$; and Total score, $t(3) = 1.56$, $p>.05$. There was also no improvement on pre versus post test scores on the State-Trait Anxiety Inventory: State, $t(3) = -.41$, $p>.05$; Trait, $t(3) = .30$, $p>.05$.

The phototherapy was not superior to the cognitive therapy, in terms of pre and post test scores. In fact, the reverse was true in comparing the scores on the Hamilton Depression Rating Scale, $t(2) = -4.76$, $p>.05$., as well as the SAD Scores of the SIGH-SAD, $t(2) = -1.59$, $p>.05$. The scores of the Beck Depression Inventory indicated that phototherapy was not superior to cognitive therapy either at the final week, $t(2) = -4.76$, $p>.05$ or one week later,

t (2) = -2.87, p>.05. When comparing the scores of the two therapies on the Problem Solving Inventory, no differences were found: Problem solving confidence, t (2) = .33, p>.05; Approach-avoidance, t (2) = -2.57, p>.05; Personal control, t (2) = -.11, p>.05; Total score, -.99, p>.05. Phototherapy was found to be superior to cognitive therapy on the State component of the STAI, t (2) = 3.89, p>.05. However, no significant differences were noted on the Trait factor of the STAI, t (2) = .49, p>.05.

Summary

The results of this study fail to support the hypothesis that phototherapy is efficacious in the treatment of the depression associated with seasonal affective disorder. These findings also do not discredit that premise, however.

CHAPTER V

Conclusion

Discussion

Since the subject pool was a relatively small number (4), one subject in the cognitive group and three subjects in the phototherapy group, results of this study are inconclusive, although several findings were statistically reliable. The improvement found on the pre versus post test scores of the BDI administered the final week and again one week later were interesting because the scores remained stable. Most of the research has shown that the effects of phototherapy exists as long as the subject is receiving light treatment but the depressive symptoms return 2-5 days after termination. The BDI given the week after the study concluded was administered within five days of the final phototherapy so up until that time, the antidepressant effects were maintained.

Phototherapy was found to be statistically inferior on several measures: HAM scores, SAD scores and both BDI scores. One subject's (02) scores appeared to have caused a skewing of the results of the phototherapy scores by scoring higher on the SAD scores, PSI scores, and the Trait score at the end of the study than she did at the initial screening. Phototherapy was superior to cognitive therapy on the State factor of the STAI.

One subject's (02) scores skewed the results because her scores were higher on the above scales at the conclusion of the

research. This subject, age 22, has experienced depression since childhood. She had been maintained on the same dose of Desipramine for several weeks in anticipation of the study. While in this study, she quit her job which was difficult for her and she was experiencing a tumultuous relationship with her boyfriend. This relationship terminated two weeks before the completion of the study. The research was completed the week before final exams which in itself is anxiety producing. This subject seemed quite stressed in preparation for finals.

Additionally, during the administration of phototherapy, this subject developed headaches and eyestrain. The researcher consulted Dr. Norman Rosenthal at the National Institute of Mental Health. The intensity of the lighting was reduced by one setting of the three settings available. When she did not respond with lower depression scores on the BDI, the length of exposure to the lights was increased to one hour but no significant subjective response was noted.

Subject 03 was diagnosed with subsyndromal SAD and made a modest improvement in her overall scores. The remaining phototherapy participant (06) was a graduate student who was experiencing considerable stress because she was working on her thesis research and was also planning a summer wedding which added more strain to the usual rigors of graduate study.

The cognitive subject (05) was an older-than-average female. This subject responded the most dramatically according to her inventory scores. Her scores on the HAM and the SAD were

substantially improved, as well as on the BDI and the PSI. It is possible that the group interaction, in addition to the content of the cognitive model, had an ameliorating effect.

Two other persons did participate in the cognitive program. One (04) did not meet the criteria for the research but was invited to participate in the group for possible improvement of her coping skills. Data was collected, however, the scores were not analyzed.

The second participant (01) in the cognitive program was started on Prozac for moderately severe depression two weeks prior to the commencement of the research which invalidated her participation in the study. She chose to attend the group for whatever benefit she could achieve.

One possible explanation for the cognitive model appearing superior in some aspects of this study was the positive benefits of the group interaction. The members of the group were quite congenial and committed to the group which offered support to each other. Group interaction of itself can produce an antidepressant effect by offering support, friendship and the knowledge that others suffer similar problems.

All of the participants of both groups had received previous counseling for depression. Phototherapy had either been discussed or suggested for them. Each subject was given a preference scale asking if they had strong feelings about the offered therapies which was rated from -5 to +5 on a Likert scale. Subject 05, cognitive therapy condition, indicated +5 for

both therapies; and Subject 02, phototherapy condition, rated phototherapy as +5. This latter subject's scores were the scores that skewed the statistics for phototherapy so her expectations did not influence her response to light therapy. The remainder of the subjects rated preferences from neutral to +3. It appears that placebo effect and subjects' expectations of treatment condition were unrelated to the outcome of the study.

In spite of the literature indicating that approximately 20% of the population suffers from seasonal affective disorder or the subsyndromal disorder, this researcher questions this prevalence rate as being high.

A control group condition will need to be used in research to determine if seasonal affective disorder is a syndrome or a rather experimenter bias.

Recommendations

The recommendations for future research in the study of the efficacy of phototherapy and cognitive models in the treatment of seasonal affective disorder are linked to the limitations found in this study.

In view of the results of this investigation, further research comparing cognitive therapy and phototherapy needs to be conducted with a larger subject pool. More extensive publicity advertising the research including using the local newspaper would be indicated. Possibly doing an article for the media that would educate the public about SAD would help the public to make

informed decisions about the possibility of becoming involved in a research study. Contacting the National Institute of Mental Health for guidance about media publicity would be prudent so as not to contaminate the study.

Contacting area mental health professionals well in advance of the proposed study would also promote more identification of possible subjects. Wider publicity on the university campuses regarding the research may also increase participation.

Scheduling the study so that it does not conflict with final exams and holiday breaks would be tricky if done on a college campus but would also be advantageous in eliminating the additional stressors associated with these factors.

In future research, the investigator may want to review medical literature which is beginning to explore the role of the thyroid in the mechanism of action in seasonal affective disorder.

Summary

Results of this study should be interpreted with great caution since this is preliminary work and the sample was small. Also, the results of this research are not generalizable to other populations because of the small sample. However, the impact that the cognitive model apparently manifested bears thought in clinical considerations in the care of seasonal affective disorder clients. Although phototherapy results were inconclusive and cannot be generalized on the basis of a small subject sample, it would seem appropriate to include in treatment

planning some cognitive work for SAD sufferers. Utilizing a group setting can maximize the effect of cognitive therapy by taking advantage of the positive aspects of group interaction.

The results of this study certainly do not discredit the efficacy of phototherapy but neither do they support it. These findings do, however, support incorporating a cognitive approach to the treatment plan for individuals suffering from seasonal affective disorder. The results of this research strongly suggest further research comparing cognitive therapy and phototherapy in the treatment of SAD.

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